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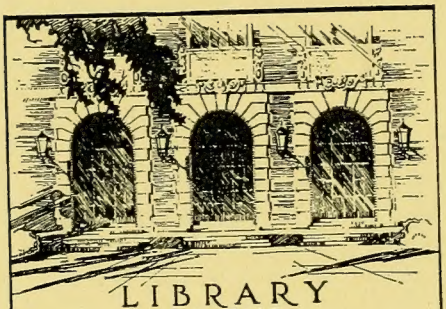

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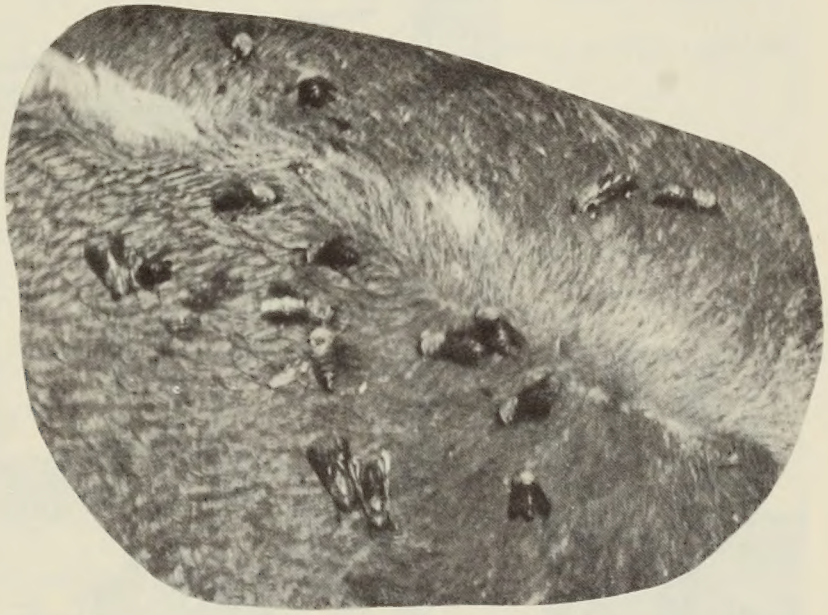
CONTROL OF HORSE FLIES ON CATTLE

Willis N. Bruce and George C. Decker



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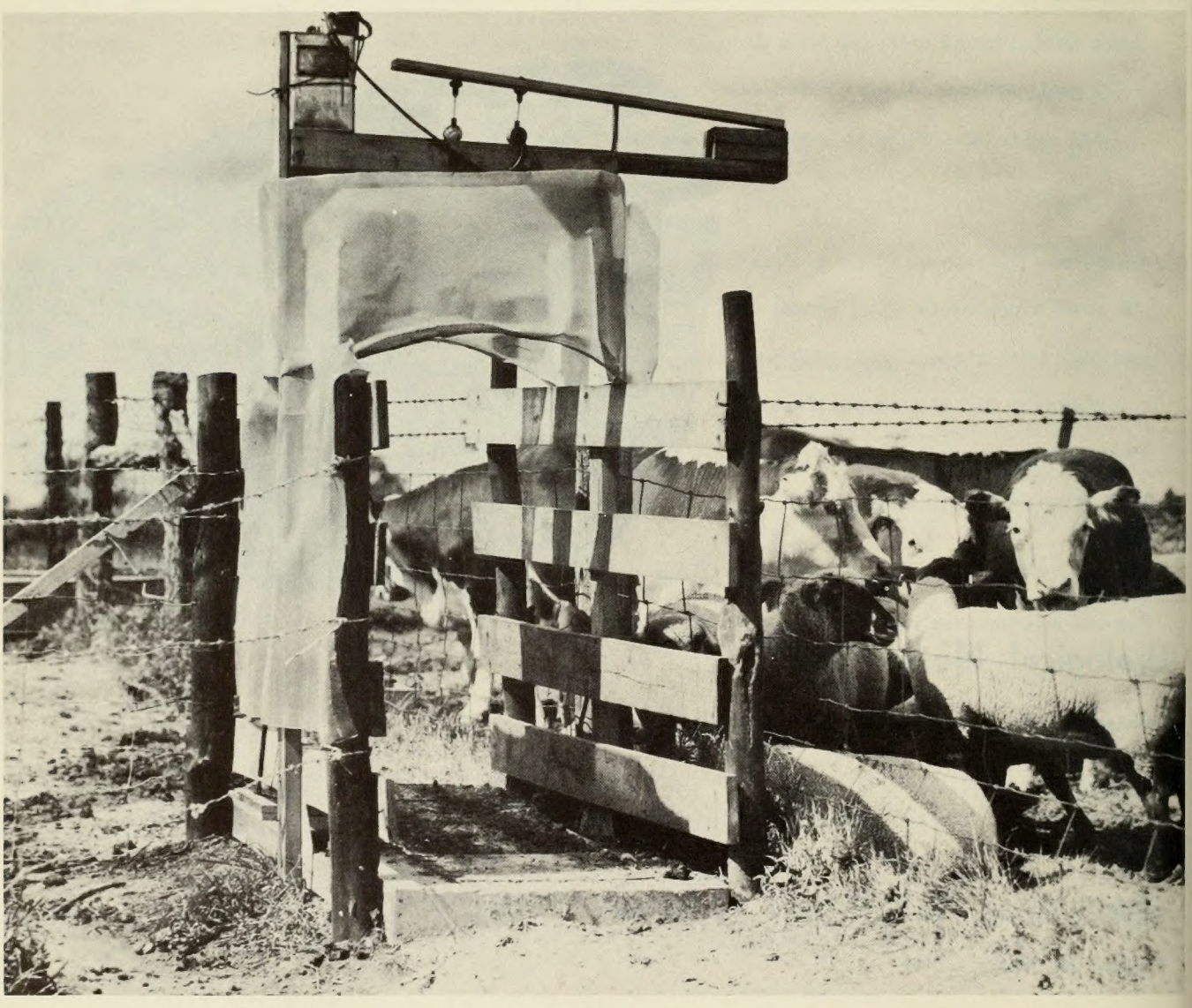
CONTROL OF HORSE FLIES ON CATTLE

WILLIS N. BRUCE AND GEORGE C. DECKER

Horse flies are important pests of cattle in many sections of the United States. Known throughout Illinois, they are most numerous in the southern third of the state. They are a source of great annoyance, and sometimes even terror, to the cattle and other animals they attack. By their persistent and painful biting they interfere with the production of milk and meat. For both humane and monetary reasons, they are a cause of concern to many owners of dairy cows and beef cattle.

From early June to middle or late August in Illinois, horse flies attack cattle, horses, mules, hogs, and other animals. They alight on the backs, shoulders, heads, and necks of their victims, and, if not dislodged at once by the terrified animals, they cut through the skin with their knifelike mouthparts and suck



Automatic microspray applicator used in 1950 experiments for control of horse flies on beef cattle.

blood for several minutes. When they have finished feeding, blood usually oozes from the punctures they have made in the skin. At times, the amount of blood lost in this manner by some animals is devitalizing.

Most of the horse flies found in Illinois belong to the genus Tabanus, and for that reason they are sometimes referred to as tabanids. The largest of these flies, and the one that does the most harm in southern Illinois, is called Tabanus sulcifrons Macquart. The male is almost an inch long and the female somewhat longer. Both are reddish-brown in color except for a row of white or yellowish triangles down the middle of the abdomen.

Like other horse flies, this large tabanid passes the winter as a nearly full-grown larva in mud, often near lakes or streams, in damp woods or marshy pastures. As it nears maturity, it wriggles to a drier spot, passes through a pupal stage, and in late spring or early summer emerges as a winged adult. The female feeds on blood of cattle and other animals, the male on nectar, honeydew, soft fruits, and similar substances. The female lays her eggs usually on plants or other objects close to water. In about a week, small maggots hatch from the eggs, drop into the water, and bury themselves in the soil at the bottom, where they feed on such small animals as insects and earthworms.

HORSE FLY CONTROL ON DAIRY CATTLE

Until very recently, no effective controls for horse flies were known. Even DDT, the miracle insecticide, proved ineffectual against blood-thirsty tabanids.

In the summer of 1947, the Illinois Natural History Survey began a systematic search for an insecticide that would control horse flies under southern Illinois conditions. Of the large number of materials tested, activated pyrethrins gave the best results. Repeated tests made the following year showed that cattle could be protected from horse flies by frequent sprayings (3 to 5 days apart) with an emulsion containing 0.125 per cent pyrethrins and 2.5 per cent piperonyl butoxide.

Further experiments were set up in 1949 to discover how a maximum amount of protection could be obtained with minimum cost and effort. Because of the necessary frequency of treatment, tests were confined to dairy animals that could be conveniently treated at least twice a week.

Twelve herds of dairy cows were divided into six groups of two herds each. Cows in three of the groups were sprayed with hand-power sprayers in which undiluted Pyrenone T-143 (1.0 per cent pyrethrins and 10.0 per cent piperonyl butoxide) was used; cows in the first of these three groups were sprayed twice daily, each time with 1 to 2 milliliters per animal; those in the second, once daily with 2 to 5 milliliters per animal; and those in the third, twice weekly with 22 to 39 milliliters per animal per treatment. Cows in the other three groups were sprayed with a knapsack compressed-air sprayer in which 1 part of

the Pyrenone concentrate was diluted with 9 parts of water; cows in the first of these three groups were sprayed three times a week, each time with one-fourth pint per animal; those in the second, twice weekly, each time with one-fourth to one-half pint per animal; and those in the third, once a week, each time with four-fifths pint to 1½ pints per animal.

Light applications of the concentrate made at frequent intervals gave the most effective control; control was best and the least material was used when light applications, each of 1 to 2 milliliters (about 1/30 to 1/15 ounce) per cow, were made twice daily. The amount of spray used was just enough to dampen the ends of the hairs on the backs and sides of animals. Good control was obtained when sprays were applied daily, three times a week, or twice a week.

Most dairymen who used the concentrate spray preferred it to dilute sprays. The concentrate was applied in small quantities with inexpensive, hand-operated, atomizing sprayers. Used as directed, it did not gum the hair or burn the hides of animals. One exhibitor of dairy cattle believed that the concentrate spray he used was largely responsible for keeping the hair of his show animals in good condition.

GAINS FROM HORSE FLY CONTROL ON DAIRY CATTLE

Southern Illinois farmers queried early in 1950 about the effect of horse flies on dairy cattle estimated that the pests were responsible for milk production losses ranging from 25 to 40 per cent. One dairyman stated that in some summers, when horse flies were unusually numerous, his milk cows became nearly dry during the fly season and were unable to return to their previous production levels even after the flies disappeared. Several years ago, C. W. Howard, an entomologist working in another state, found that sustained attack by horse flies reduced milk production 66 per cent in 2 weeks and nearly 100 per cent in 3 weeks. Under attack by horse flies, animals suffer not only from loss of blood but from loss of grazing time and energy, which they dissipate in attempts to evade their pain-inflicting enemies.

To measure gains resulting from horse fly control on dairy cattle, experiments were established involving 25 southern Illinois herds (293 cows) in the summer of 1950. Twelve of the herds were treated with Pyrenone concentrate or with emulsions containing not less than 1.0 per cent piperonyl butoxide and 0.1 per cent pyrethrins. Excellent tabanid control was obtained. Of the other 13 herds, used as checks, 6 were treated with DDT, 5 with methoxychlor, and 2 with repellent sprays. The DDT and the methoxychlor were used primarily to eliminate horn flies.

The experiment extended through four successive test periods of 30 days each. Treatment was started June 29, at the end of the second period, and continued through the fourth period. Butterfat production records were used to measure the effect of tabanid control. Production of butterfat in treated herds

jumped 3.2 pounds per cow for the period following treatment, whereas production in untreated herds fell off 1.7 pounds per cow for the same period. In general, butterfat production went down as the number of tabanids per cow went up.

Especially noteworthy were the records of seven cows in continuous lactation throughout the experiment. These cows were subjected to a heavy outbreak of two species of small tabanids that appeared in May and lasted through June, when the large tabanids became abundant. Attack by the tabanids was quickly followed by a drop in butterfat production. However, during the first period following treatment, an increase of more than 20 per cent occurred. In the two periods before treatment on June 29, the seven cows averaged 45 and 41 pounds of butterfat per cow; in the two periods following treatment, they averaged 52 and 49 pounds per cow.

HORSE FLY CONTROL ON BEEF CATTLE

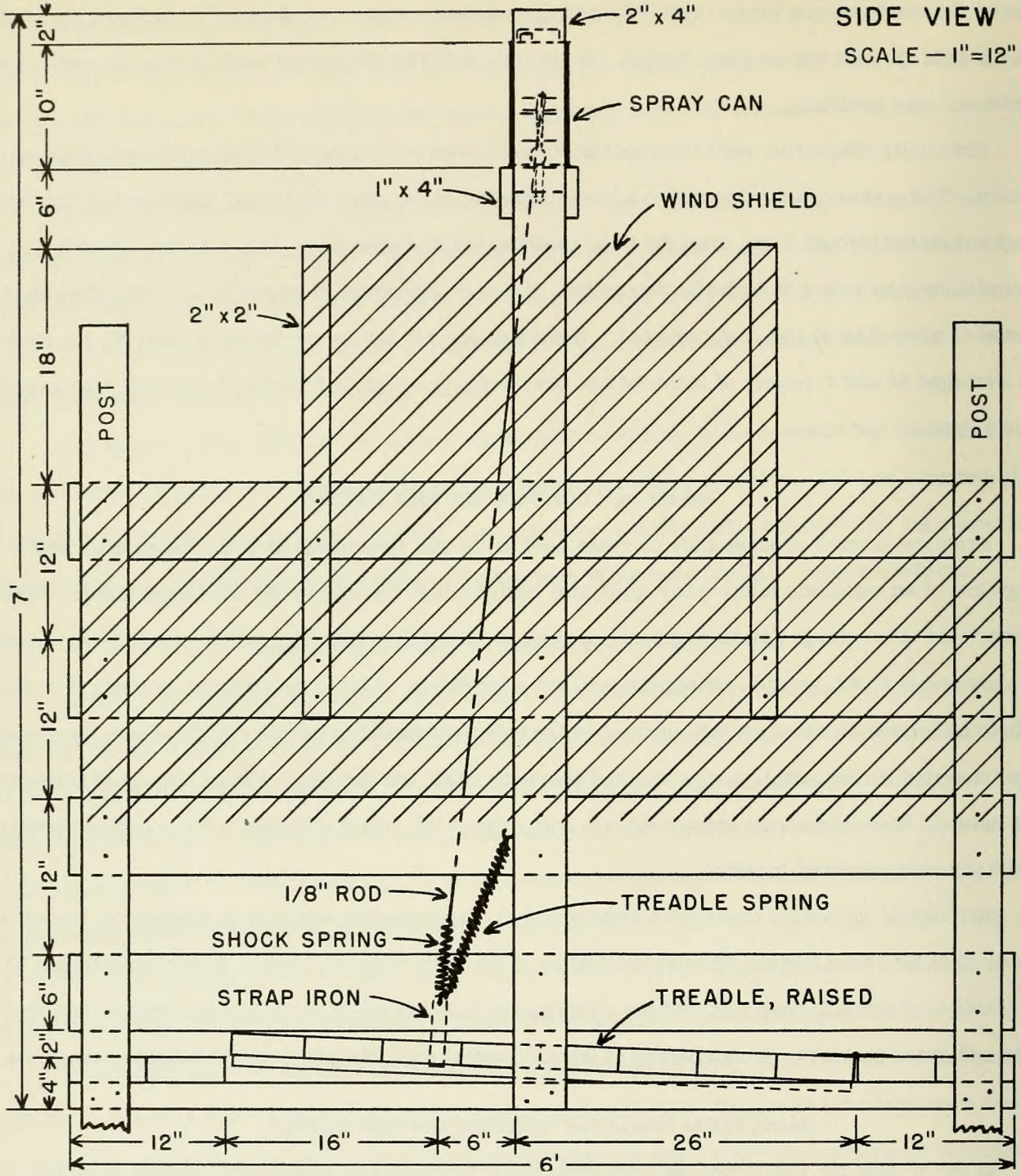
Practical control of horse flies on range beef cattle was first obtained in the summer of 1950 through use of an automatic microspray applicator designed and constructed by the senior author. The unit consisted of two small hydraulic pumps, nozzles, copper connecting pipe, gallon can of spray concentrate, homemade chute, treadle, connecting rod, and wind shield. When a beef animal, in passing through the chute on the way to water or salt, stepped on the treadle mounted in the floor of the chute, the connecting rod operated the two small pumps mounted above the chute and sprayed a minute amount of concentrate on the animal. The concentrate spray used was Pyrenone T-143, which contained 1.0 per cent pyrethrins and 10.0 per cent piperonyl butoxide.

Throughout the period horse flies were abundant, the apparatus was used in pasture no. 1 of experiment no. 10 at the Dixon Springs Experiment Station of the University of Illinois. In this experiment, 10 comparable beef animals were pastured for a designated time in each of six adjoining 10-acre improved legume and grass pastures. A high degree of tabanid control was obtained on the animals in pasture no. 1.

GAINS FROM HORSE FLY CONTROL ON BEEF CATTLE

In the 38 days for which records were kept, the 10 beef cattle in pasture no. 1 gained 20 to 30 pounds per animal more than those in the other pastures. These weight gains were striking but, because of the shortness of the test period, they should not be considered conclusive.

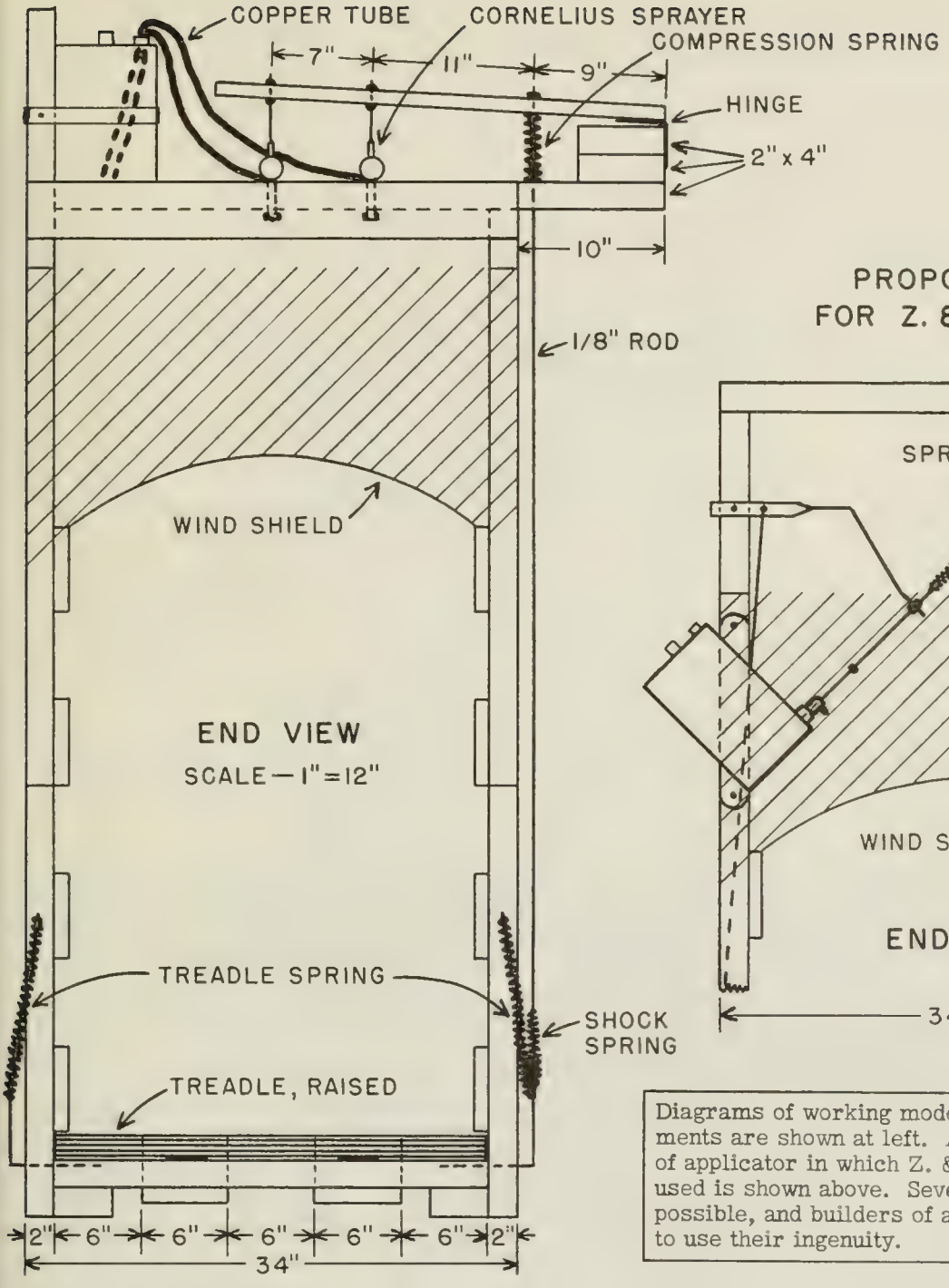
In all but one of pastures 2 through 6, fly counts and weight gains were roughly proportional to the nearness of these pastures to pasture 1. Evidently, many horse flies from the other pastures wandered into pasture 1, where they came in contact with the insecticide on the sprayed animals.



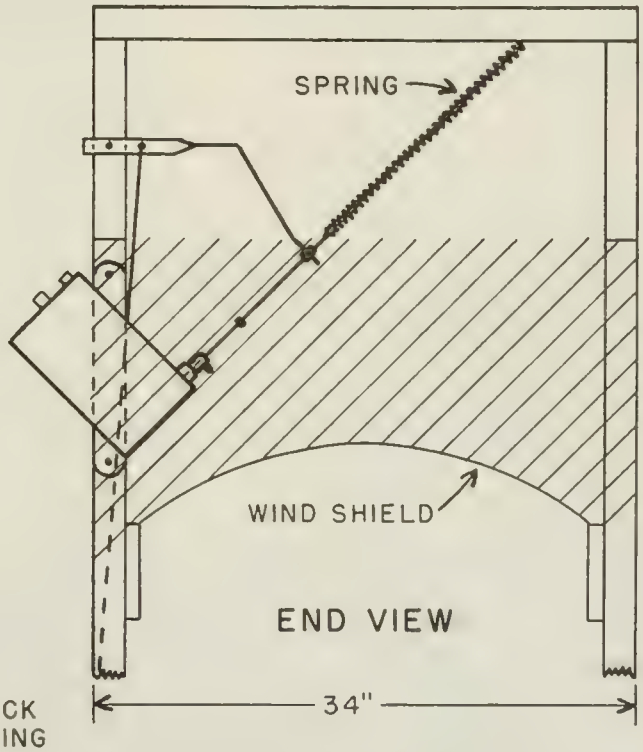
PLANS FOR AUTOMATIC SPRAY APPLICATOR

Most materials are indicated in diagrams. The wind shield may be of plastic-coated screen wire (as in working model) or other suitable material, including burlap, canvas, or sheet iron.

Sprayers used in working model are Cornelius. (Any similar sprayer that delivers about 1/30 ounce per stroke may be substituted.) Intake line of Cornelius sprayer should be bent as shown on page 8 to allow small check valve to function. The copper tubing from gallon spray container should be soldered directly to sprayer intake line. Other metal or oil-resistant plastic (Tygon) tubing may be substituted for copper. With Z. & W. sprayer, no tubing is needed, but garden-hose fitting should be soldered near bottom of can as shown on page 8.



PROPOSED PLAN
FOR Z. & W. SPRAYER



Diagrams of working model used in 1950 experiments are shown at left. A proposed adaptation of applicator in which Z. & W. sprayer may be used is shown above. Several adaptations are possible, and builders of applicators are urged to use their ingenuity.

The two treadle springs may be heavy duty door springs. The shock spring should be short and heavy enough to absorb the sudden application of animal weight on treadle. The compression spring (or, with Z. & W. sprayer, a light extension spring) should be strong enough to lift the lever and extend the spray plunger.

Plunger rod of sprayer should be loosely attached to lever to reduce friction and wear in sprayer.

Connecting rod, which is attached to treadle and operates sprayer, may be a heavy wire or 1/8 to 3/16 inch iron rod.

General directions: Place chute on well-drained soil and where cattle must pass through it on the way to water or salt. Treat posts, treadle, floor, and other wood parts with creosote or other wood preservative. Keep water and water sprays out of sprayer to prevent its corroding.

Consumption of spray by the automatic microspray applicator averaged about 2.4 milliliters (1/12 ounce) per animal per day. One gallon of spray concentrate gave 1,667 animal-days of protection. The cost was approximately 1 cent per animal per day.

CONTROL OF OTHER KINDS OF FLIES

Methods that controlled horse flies on dairy cattle controlled horn flies and stable flies also. In barns where cows were sprayed regularly for control of horse flies, house flies were unusually scarce. On beef cattle, the automatic applicator controlled horn flies as well as horse flies; modifications might be needed to control stable flies, which were not numerous enough on the test animals to require control.

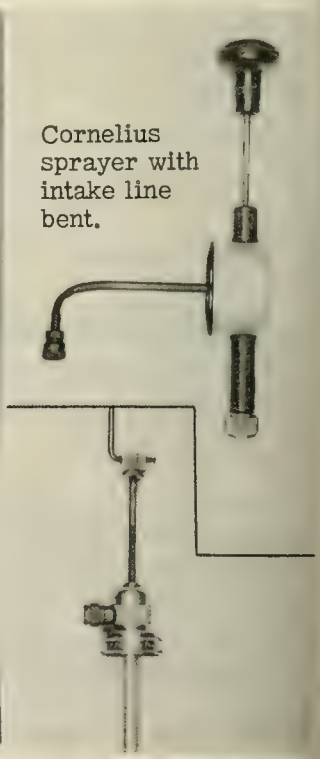
SUMMARY OF RECOMMENDATIONS

Material: Pyrenone T-143 (1.0 per cent pyrethrins and 10.0 per cent piperonyl butoxide) or similar activated pyrethrins.

For dairy cattle: (1) Undiluted material, 1/15 to 1/6 ounce per cow daily (about eight strokes of small atomizing sprayer), 1/2 ounce per cow three times weekly, or 1 ounce per cow twice weekly; or (2) material diluted with 9 parts water, 1/2 to 1/4 pint per cow two or three times weekly.

For beef cattle: Undiluted material in automatic microspray applicator shown on pages 6 and 7. Applicator regulated to deliver about 1/30 ounce per stroke.

Z. & W. sprayer attached to garden-hose fitting soldered to gallon spray can.



Cornelius sprayer with intake line bent.

Z. & W. sprayer.